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TRANSMITTAL OF APPEAL BRIEF (Large Entity)

4-19-4

Docket No. 00240078AA

In Re Application Of: **E. Foster, et al.**

Serial No.	Filing Date	Examiner	Group Art Unit
09/534,901	March 23, 2000	A. M. Mirza	2141

Invention: **BLOCK BASED NEGATIVE FILTERING OF MPEG-2 COMPLIANT TABLE SECTION**

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

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Marshall M. Curtis

Signature

Dated: **April 12, 2004**

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#4
4-19-4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re patent application of

Foster et al.

Serial No. 09/534,901 Group Art Unit 2141

Filed March 23, 2000 Examiner Mirza, Adnan M.

For BLOCK BASED NEGATIVE FILTERING OF MPEG-2 COMPLIANT TABLE SECTION

Assistant Commissioner for Patents
Washington, D.C. 20231

APPELLANT'S BRIEF UNDER 37 C.F.R. §1.192

This brief, which is filed herewith in triplicate, is in furtherance of the Notice of Appeal, filed in this case on February 12, 2004

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. §1.192(c)):

I. REAL PARTY IN INTEREST

II. RELATED APPEALS AND INTERFERENCES

III. STATUS OF CLAIMS

IV. STATUS OF AMENDMENTS

V. SUMMARY OF INVENTION

VI. ISSUES

VII. GROUPING OF CLAIMS

VIII. ARGUMENTS

☐ ARGUMENT VIIIA. REJECTIONS UNDER 35 U.S.C. §112, FIRST

I. REAL PARTY IN INTEREST

The real party in interest in the appeal is:

☐ the party named in the caption of this brief.

☑ the following party: International Business Machines Corp.
Armonk, New York 10504

II. RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal:

☑ there are no such appeals or interferences.

☐ these are as follows:

III. STATUS OF CLAIMS

The status of the claims in this application are:

A. Total number of claims in Application

Claims in the application are: claims 1 to 14

B. Status of all the claims:

1. Claims cancelled: none
2. Claims withdrawn from consideration but not cancelled: none
3. Claims pending: claims 1 to 14
4. Claims allowed: none
5. Claims rejected: claims 1 to 14

C. Claims on Appeal.

The claims on appeal are: claims 1 to 14

IV. STATUS OF AMENDMENTS

The status of amendments filed subsequent to the final rejection are as follows:

A Request for Reconsideration was filed February 2, 2004. As indicated by the Advisory Action mailed June 5, 2002, the Request for Reconsideration was entered for purposes of this appeal. The Request for Reconsideration submitted a clean copy of claims 1 through 14 in the amendment filed on February 2, 2004.

No amendment has been filed subsequent to the final rejection but only the Request for Reconsideration, filed February 2, 2004. The Advisory Action indicated that the Request for Reconsideration would be entered upon filing of a Notice of Appeal. Therefore, it is believed that all amendments filed in this application have been entered.

V. SUMMARY OF INVENTION

The invention as defined in the claims on appeal is directed to the field of digital signal processing and more specifically, to storage and retrieval of MPEG-2 program data. MPEG is the acronym for Motion Picture Expert Group (MPEG) and is an International Standards Organization (ISO) standard. The invention provides filtering of an MPEG Transport Stream (TS) to eliminate unnecessary data and allow cost effective storage of selected programs that are transmitted within a stream of data. For example, the digital satellite or cable television signal contains all the broadcast programs and data (program guide, internet messages, etc.) for more than 200 individual television local and subscriber channels that are streaming into the home receiver every minute of the day. This program data is inserted into tables that are transported to the end user as part of the program specific payload. The location of these tables within the MPEG-2 Transport Stream is shown in Figure A attached to this appeal brief (Attachment A). This figure was used as an attachment in the previously filed amendment of February 2, 2004.

One aspect of the invention is to enable a user to select and record (store) a particular program contained within the enormous stream of incoming data. In order to make the storage device cost effective for the user, the storage capability needs to minimize the amount of hardware required to capture the desired data signals. It is the combination of coding and filtering of specific data within a larger transport stream that allows a specific subset, or a program, to be captured for storage. To select the specific program data, the invention is a flexible hardware filter that is capable of mixed positive and negative filtering at any desired granularity of mixing.

The filtering method of the invention is shown in Figure 2 (a copy of which is provided in Attachment B and is one of the original drawings from the subject application) and illustrates the performances of a plurality of comparison/filtering functions on a first data block of a table section header. The Table Section Header 30

of the data stream 76 is compared on a byte by byte basis to each filter block 100 using the filter algorithms of each filter block (e.g., as defined by signals in filter register 20, mask register 10 and not match register 40 of Figure 1 of the invention, a copy of which is provided in Attachment B). The number N of multiple filter blocks used on a single block of data is referred to as the first column 210. Multiple filter blocks 100 are generally required to accommodate the MPEG-2 standard but it should be understood that one, two, or many filter blocks may be used to support the specific data type of the data stream.

Comparison of the data stream to each filter block will provide a single bit of compare result (CR) 200 for each filter block 100 compared. The compare results CR 200 together form a matchword with a maximum size of, for example, 32-bits (one for each possible Filter ID). The invention then continues to perform the filtering of subsequent blocks of data as shown in Figure 3 of the invention (a copy of which is provided in Attachment B) where the filter blocks are again set up as a column 310. The filter blocks are compared with the data block to form another matchword. A single matchword is formed for each column of filter blocks. Finally, as shown in Figure 4 of the invention (a copy of which is provided in Attachment B), regardless of the type of filtering (e.g., negative, positive, etc.) if a logic "1" is in the corresponding bit of the accumulated match word this indicates that the data in the table section data stream corresponded to the respective filter algorithm and this data is the desired data as selected by the Filter IDs and the data is then sent to memory for storage.

The table IDs contained in the table section header used by the present invention are those generated and transmitted by the existing program provider as part of the standard MPEG-2 data stream. The subject invention does not introduce new requirements for the broadcast source to generate table section data specifically for the subject invention. The subject invention performs the filtering, storage and fast retrieval capabilities within the existing MPEG-2 standard data format.

VI. ISSUES

A. Whether claims 1 to14 are unpatentable under 35 U.S.C. §103(a) over Komi et al. (U.S. Patent No. 6,477,185) and Mao (U.S. Patent No. 6,459,427).

VII. GROUPING OF CLAIMS

The claims do not stand or fall together. Reasons as to why the claims are separately patentable are included in the arguments.

ARGUMENT VIIID. REJECTIONS UNDER 35 U.S.C. §103

Claims 1 to14 stand rejected under 35 U.S.C. §103(a) over Komi et al. (U.S. Patent No. 6,477,185) and Mao (U.S. Patent No. 6,459,427). Komi et al. and Mao taken together or separately do not show nor suggest the claimed invention.

With respect to claims 1 and 8, the Examiner is equating the PID reference table (also called the PID management table 100) of Komi et al. with the table ID field of claim 1,

> "...determining presence of transport table sections in a payload portion of a packet of said datastream from a **table identification (TID) field** in a header of said packet..."

This is in error. The table ID field of the claimed invention is in the header field of the table section data structure of the MPEG-2 standard. The MPEG-2 standard has a nested layering structure. The Packet Identifier (PID) used by Komi et al. is part of the MPEG-2 Transport Stream header information. The tables on which the claimed invention are filtering are part of the transport stream packet payload. Figure A of this paper a copy of which is provided in Attachment A) shows a simplified example of the location for the MPEG-2 system tables and table ID as well as the location of the PID. This figure clearly shows the PID used by Komi et al. to be at a layer different from the system table layer of the claimed invention. Furthermore, the figure shows the distinction between the PID used by Komi et al. and the table ID used by the claimed invention. The MPEG-2 specification includes several mandatory types of tables which describe the content of the stream. The required tables specify viewing programs in the stream, as well as necessary information such as the audio and video PIDs for each program. The same data structure can be used to send private data, such as a software update for the receiver. A table is transmitted as one or more table sections. The first field in the table section is the table ID, which allows the receiver to identify all of the table sections for a table so that the receiver can reconstruct the

complete table data structure. The table ID allows multiple tables to be transmitted in a single transport stream. Table sections can span multiple transport packets that may be spaced some distance apart in the transport stream. The receiver must be able to reconstruct a table section as a continuous structure in memory. Furthermore, multiple table sections, or portions of them, may be contained in a single packet. Finally, table sections are repeated in a stream to permit random access by the receiver. Thus, once a particular table section is acquired, it is not necessary to acquire it again until it has changed. It is these table sections that are being filtered by the claimed invention.

This is in contrast to the tables defined by Komi et al. The PID reference (management) table 100, PID table 36, and the writing address table 101 are tables built by Komi et al. and stored as look up tables. The reference cited by the Examiner in Komi et al. refers to the PID reference table 100 that is created by collecting the Packet IDs from the packet headers and forming, at the set-top-box (STB), a table to relate the PIDs with the data types of the packets. These tables are created by Komi et al. by analyzing the incoming transport data stream and extracting the header IDs and other information. The claimed invention **does not create tables** but filters the existing MPEG-2 table sections using a filter ID (table ID).

In addition, the claimed invention is filtering on the table ID so as to capture the system table information from the transport stream. This table information can include program guides and other identifying information. Once this information is captured, the claimed invention is looking for a change in the table information. When a change is detected, the new table data is captured and used to change program viewing data. This is not the same as for Komi et al. Komi et al. is filtering using the PIDs that identify each and every multiplexed stream of audio and video data. Komi et al. then prioritizes decoding of the data based on the PIDs contained in the packet headers. Therefore, not only is the physical data used for filtering different but the performance of the system as a result of the filtering is significantly different.

In addition to the foregoing deficiencies of Komi et al. to answer the recitations of the claims, the Examiner admits that Komi et al. does not disclose "filtering of a portion of said transport table sections in accordance with a mask which defines a filter function and a logic state of a not match bit to provide a compare result and relies on Mao for such a teaching. However, it is respectfully submitted that Mao does not provide such teachings or evidence of a level of ordinary skill in the art which would support the conclusion of obviousness which the Examiner has asserted.

There are two key differences between the subject invention and the Mao reference cited by the Examiner. First, the use of tables for filtering are different in that the subject invention filters using the standard MPEG-2 tables that are generated by the broadcast source. Second, the filtering method of the subject invention is significantly different from the filtering used by Mao.

With respect to the use of different tables, Mao discloses a system that transmits Internet data and uniquely generated (non-MPEG standard) tables through the television broadcast network. This requires that the Internet data and unique tables be mapped onto the MPEG stream at the broadcast source and be disassociated at the end user location. The phrase 'table ID' (column 8, lines 3 - 5) is used by Mao as a means for locating and filtering the Internet data within the broadcast stream. These tables are not the same as for the subject invention. The tables that Mao is filtering are tables unique to the overlaid Internet data and are not the MPEG tables generated by the broadcast source for identifying television program information. Specifically, Mao describes these new tables in column 8, lines 30 - 54 as the HTML Program Association Table (MPAT), HTML Program Map Table (HPMT), HTML Event Information Table (HEIT) and the HTML Session Information Table (HSIT). These are not the MPEG-2 standard tables presented in the typical MPEG-2 transport data stream. However, as shown by Mao in Figure 4 of Mao 6,459,427 (a copy of which is

included in Attachment A) and included here as Figure B, these tables are different from the MPEG standard, and therefore, different from the tables used by the subject invention.

Figure C of this paper is a consolidation of Figure B of this paper (Figure 4 from Mao) together with Figure A of this paper to show the location within the transport stream of the two completely different tables. As can be seen in Figure C of this paper, the tables used by Mao are at a layer above the MPEG transport packets and are thus stripped from the MPEG data stream before the packet ID and table ID packets are available at the end user location.

With respect to the filtering method of the subject invention, the subject invention describes in detail in independent claims 1 and 8, the use of a mask and not match bits to identify the specific program information to be isolated and stored. As recited in claim 1,

> "...filtering a portion of said transport table section in accordance with a **mask** which defines a filter function and a logic state of a **not match bit** to provide a compare result,..."

and recited in claim 8,

> "...filtering a portion of said datastream in accordance with a logic state of a **not match bit** and a Filter ID to provide a compare result,..."

Mao does not describe and therefore does not enable a filtering method, The only reference in Mao to filtering in column 8, lines 3 - 8 which recites,

> "Each table can be separated and filtered by the set-top decoder through tableID and/or tableID_extension fields. The MPEG-2 table structure is segmented and carried over MPEG-2 transport packets, which can be filtered through the PID (packetID) by the decoder."

The first sentence of this reference deals with the uniquely generated Internet tables of Mao. The second sentence of this passage acknowledges that the MPEG-2 tables are

different from the Mao specified tables and can be filtered using the packet ID (PID). Mao makes no attempt to use these MPEG-2 tables nor does Mao describe how the PID would be used to filter these tables. Stating that a table can be filtered is a feature acknowledged in the art similar to saying data within a database can be sorted. It is the method and structure of the filtering by the subject invention that is being claimed and not the generic concept that tables can be filtered.

Referring to claims 2 and 9, the Examiner is suggesting that Komi et al. in combination with Mao is using a control word to filter the transport stream. This is also in error. First of all, column 11, lines 5 - 11 of Komi et al. refers to a PID filter 31 which has been created from the PIDs located in the packet headers and is not related to the table sections of the MPEG-2 transport stream. In addition, neither Komi et al. or Mao use the term *control word* as recited in claim 2,

"...said filter ID is implemented in a control word."

Furthermore, as discussed above, the claimed invention is filtering the MPEG-2 table sections using the filter ID implemented as a codeword. While Komi et al. is extracting higher priority packets from the data stream using the PIDs that have been extracted from the packet header and stored in a table created by Komi et al. at the receiver location. Therefore, any combination of Komi et al. and Mao could not give the same result as the claimed invention.

With respect to claims 3 and 10, the Examiner is again citing column 11, lines 5 - 11 as a reference for the filter ID. The PID filter 31, of Komi et al. has been created from the PIDs located in the packet headers and is not related to the table sections of the MPEG-2 transport stream. The concept of section filter ID and next filter ID as recited in claims 3 and 10,

"...filter ID includes a section filter ID and a next filter ID..."

does not make sense in the context of a PID table 36 as defined by Komi et al. That is because only the claimed invention is filtering the MPEG-2 table sections using the

filter ID relative to tables. Komi et al. is extracting specific data packets based on priority information that is determined with the PID and stored in a table called a PID Management Table (PMT). This table is unrelated to the MPEG-2 system tables, that are created with the MPEG-2 encoded transport stream. The functions provided by Komi et al. and the claimed invention are completely different. Any combination of Komi et al. and Mao would not result in filtering the sections tables as discussed above for claim 1 since Komi et al. does not filter on the system tables.

Similar arguments are appropriate for claims 4, 11, 5, 12, 6, 13, 7, and 14. Komi et al. is filtering using PIDs from a different locations and layer (or level) of the transport stream than that accessed by the claimed invention. The tables mentioned in the claimed invention are different from the tables in Komi et al as explained above and shown on Figure 1 of this paper. The Komi et al. tables have been created by Komi et al. using the PID and are stored as part of the Komi et al. system. The claimed invention is using the table sections and the IDs within those table sections to filter the transport stream. Komi et al. does not use or address the MPEG-2 system table as does the claimed invention. Therefore, there is no combination of Komi et al. with Mao that would get filtering using the MPEG-2 system table information.

In summary, claims 1 - 14 include all the claims presented in the subject invention. The claims are grouped together because the Examiner has rejected all the claims as a single group. Furthermore, the rejection relates to the use of the filter ID and the not match bit masks which are limitations of both claim 1 and claim 8. As discussed above, the data that is filtered by the invention is the data contained within the program specific table information that is part of the standard MPEG-2 data stream. This data stream is significantly different from the data stream to which Mao is directed as shown in Figure C of this appeal brief. This figure clearly illustrates that Mao has appended unique tables on top of the standard MPEG-2 data stream. The subject invention is using the data created by the program providers and is filtering

using the Filter ID, table ID and not match bits to facilitate the storage and fast retrieval of the program data.

The claims stand on their own and are separately patentable. Claim 1 relates to the method of filtering the transport data stream which contain the transport table sections. Claim 2, which depends from claim 1, further limits the subject invention by requiring that the filter ID be implemented in a control word. This limited is discussed above as being distinctly different from Komi et al. or Mao and allows the subject invention to specified the filter ID in a control word along with other data such as a next column flag, a match/not match flag filter to control arbitrary filtering over long bit streams. Claim 3 addresses the concept of using filter ID and next filter ID in such as fashion as to form a column of filter ID's for each data block to form rows of comparisons. Claims 4, 5, and 6 are separately patentable as they are the sequential steps within the method of creating and combining the compare results matchwords. This operations is described beginning on page 16, line 5 through page 17, line 28 of the subject application and provides the benefit that the comparisons can be made regardless of whether negative or positive filtering has been done and on variable length data blocks. In claim 4, the matchword is then logically ANDed (or ORed) with the matchwords of the other data block matchwords to form a single matchword. Claim 5 provides the step of combining the matchwords and claim 6 provides the decision criteria to determine in the logical AND or logical OR is used based on the negative or positive filtering method used for each row as specified by the filter ID. Finally, claim 7 specifies that the logic function of claim 4 is selected as specified by an extra bit in the control word.

Claim 8 relates to the method of filtering the transport data stream which contain the actual program data. Claim 2 through claim 14 are dependent upon claim 8 and provide similar steps to claims 2 - 7. These steps are each separately patentable in that they delineate a unique action to be performed to further select the desired

program information from the datastream. That is, claim 9 specifies that the filter ID is formed as a control word. Claim 10 specifies that the filter ID includes both a section filter ID and next filter ID. Claim 11 allows the ANDing or ORing of the compare results bits. Claim 12 provides for the accumulation of the blocks of filtered data so that the program may be stored for retrieval or other uses. Claim 13 provides the decision criteria to determine in the logical AND or logical OR is used based on the negative or positive filtering method used for each row as specified by the filter ID. Finally, claim 14 specifies that the logic function of claim 4 is selected as specified by an extra bit in the control word.

In view of the foregoing, it is respectfully submitted that the Examiner has not, in fact, demonstrated through a compelling line of reasoning that Komi et al. and Mao contain teachings, suggestions or evidence of the level of ordinary skill in the art which would support the conclusion of obviousness which the Examiner has asserted. Therefore, it is respectfully submitted that the Examiner has not made a *prima facie* demonstration of obviousness in regard to any claim in the application and that the rejection of claims 1 - 14 is clearly is error and unsupported by the references relied upon. Accordingly reversal of the final rejection by the Examiner of claims 1 - 14 is respectfully requested.

ARGUMENT VIIIE. REJECTION OTHER THAN 35 U.S.C. §§102, 103 AND 112

There are no rejections other than under 35 U.S.C. §§102, 103 and 112.

IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL (37 C.F.R. §1.192(C)(9))

The text of the claims involved in the appeal are:

1. A method of filtering a datastream containing transport table sections, said method comprising steps of

determining presence of transport table sections in a payload portion of a packet of said datastream from a table identification (TID) field in a header of said packet,

filtering a portion of said transport table sections in accordance with a mask which defines a filter function and a logic state of a not match bit to provide a compare result,

selecting a next mask and a portion of said transport table sections in accordance with a filter ID, and

combining compare result values in accordance with a logic values of not match bits in a not match indication register,

whereby an arbitrary length of said transport table sections are filtered by an arbitrary number of filters having arbitrary filter functions.

2. A method as recited in claim 1, wherein said filter ID is implemented in a control word.

3. A method as recited in claim 2, wherein said Filter ID includes a section filter ID and a next filter ID.

4. A method as recited in claim 1, wherein said combining step includes ANDing or ORing compare result values of a bit or over a group of bits in accordance with logic values of not match bits corresponding to said bit or

group of bits.

5. A method as recited in claim 4, wherein said combining step further includes the step of

accumulating a matchword over a plurality of blocks of filtered data.

6. A method as recited in claim 5, wherein said step of accumulating a matchword is performed by

ANDing a current matchword bit with a corresponding bit of a previous matchword if the filtering applied to the current block is positive or mixed filtering, and

ORing a current matchword bit with a corresponding bit of a previous matchword if the filtering applied to the current block is negative filtering

in accordance with said contents of said not match indication register.

7. A method as recited in claim 5, wherein said step of accumulating a matchword is performed in accordance with logic functions specified by at least one extra bit.

8. A method of filtering a datastream, said method comprising steps of

filtering a portion of said datastream in accordance with a logic state of a not match bit and a Filter ID to provide a compare result, and

combining compare result values in accordance with a logic values of not match bits in a not match indication register corresponding to said portion,

whereby an arbitrary length of said datastream is filtered by an arbitrary filter function.

9. A method as recited in claim 8, wherein said filter ID is implemented in a control word.

10. A method as recited in claim 9, wherein said Filter ID includes a section filter ID and a next filter ID.

11. A method as recited in claim 8, wherein said combining step includes ANDing or ORing compare result values of a bit or over a group of bits in accordance with logic values of not match bits corresponding to said bit or group of bits.

12. A method as recited in claim 11, wherein said combining step further includes the step of

accumulating a matchword over a plurality of blocks of filtered data.

13. A method as recited in claim 12, wherein said step of accumulating a matchword is performed by

ANDing a current matchword bit with a corresponding bit of a previous matchword if the filtering applied to the current block is positive or mixed filtering, and

ORing a current matchword bit with a corresponding bit of a previous matchword if the filtering applied to the current block is negative filtering

in accordance with said contents of said not match indication register.

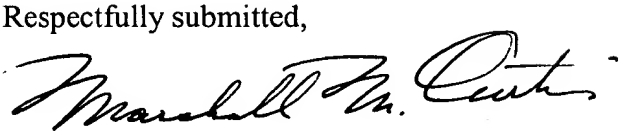
14. A method as recited in claim 12, wherein said step of accumulating a matchword is performed in accordance with logic functions specified by at least one extra bit.

X. OTHER MATERIALS THAT APPELLANT CONSIDERS NECESSARY OR DESIRABLE

Attachment A: Figures A, B and C of this appeal brief

Attachment B: Copy of Figures 1, 2, 3, and 4 from the patent application.

Respectfully submitted,



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ATTACHMENT A

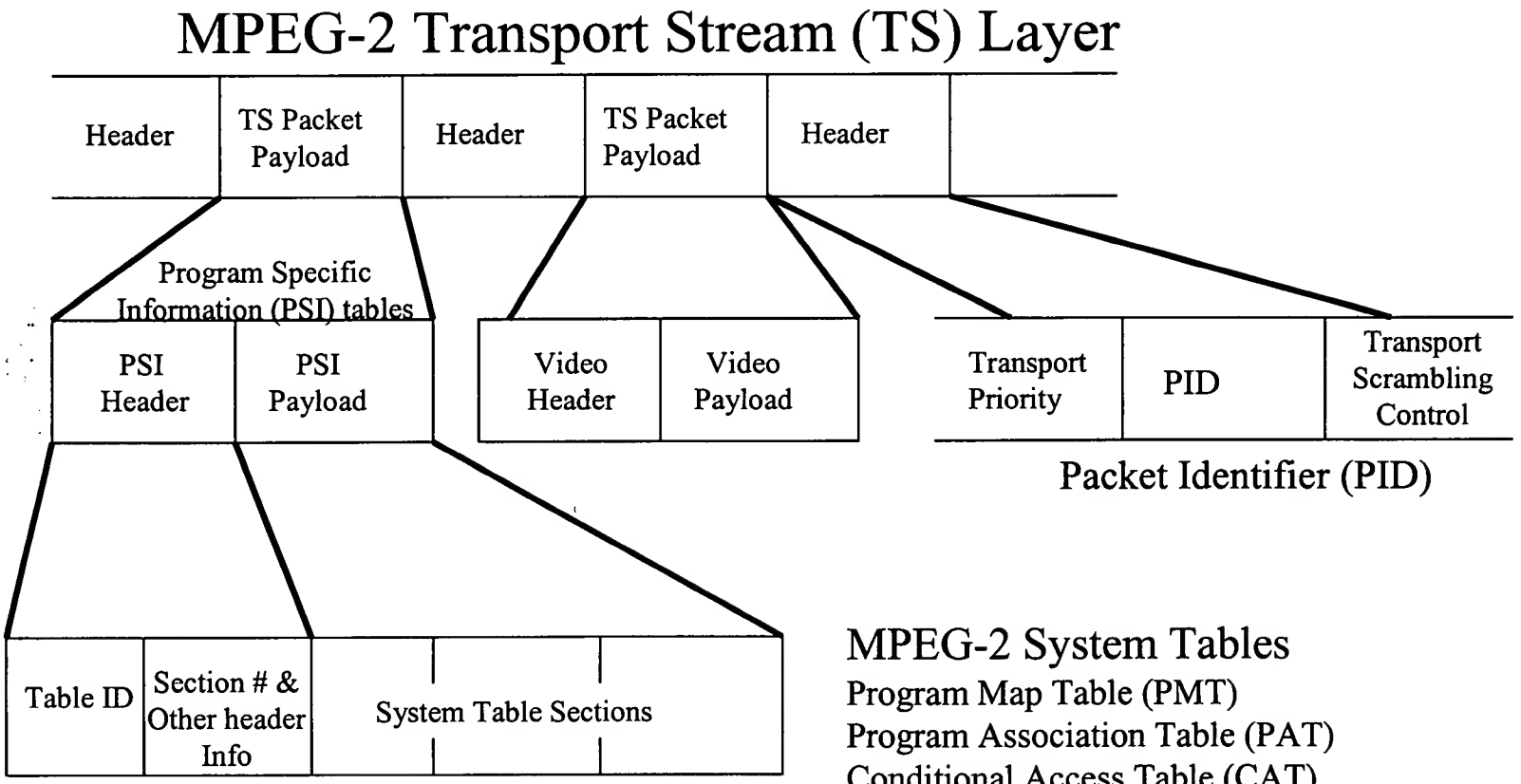


Figure A

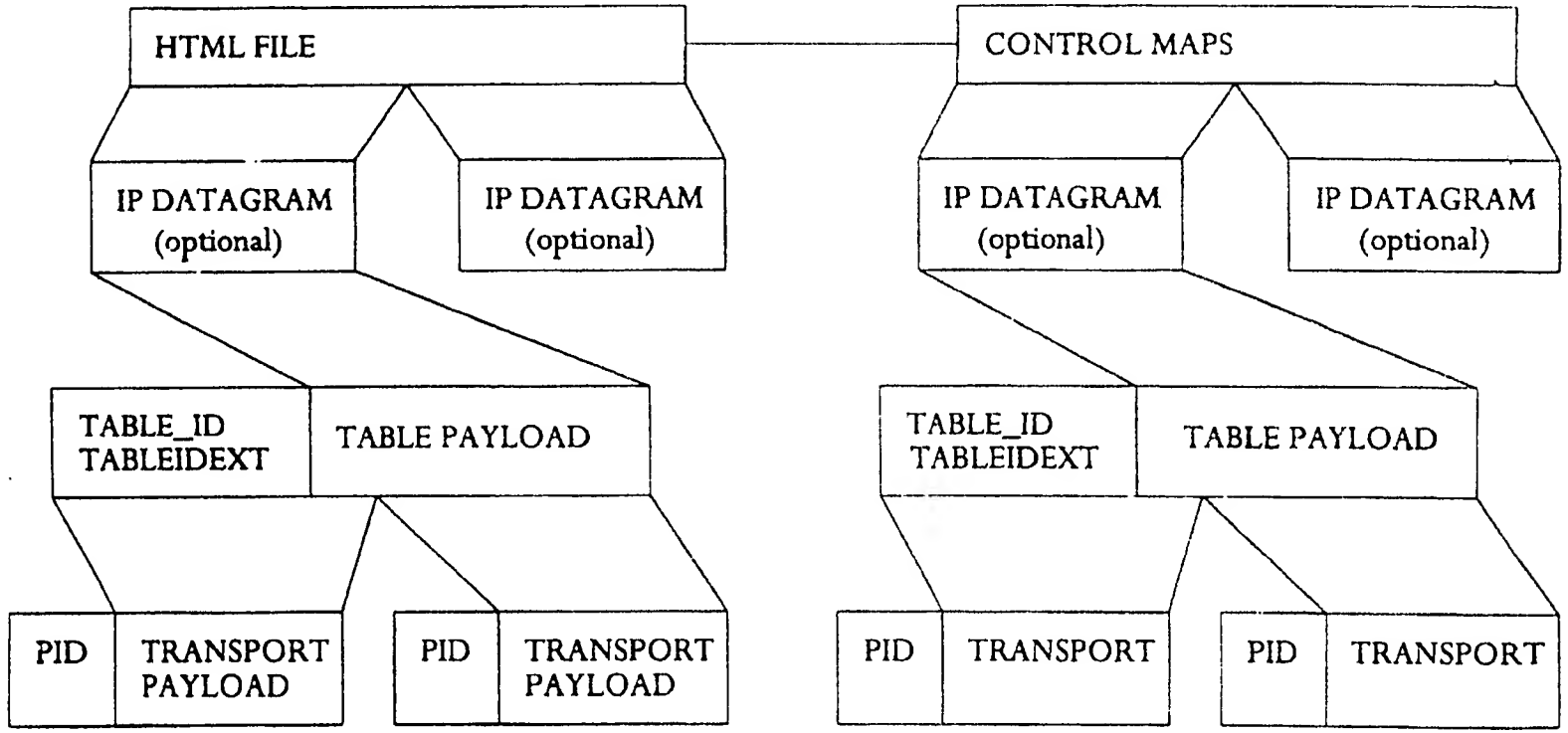


Figure B
(Figure 4 of Mao)

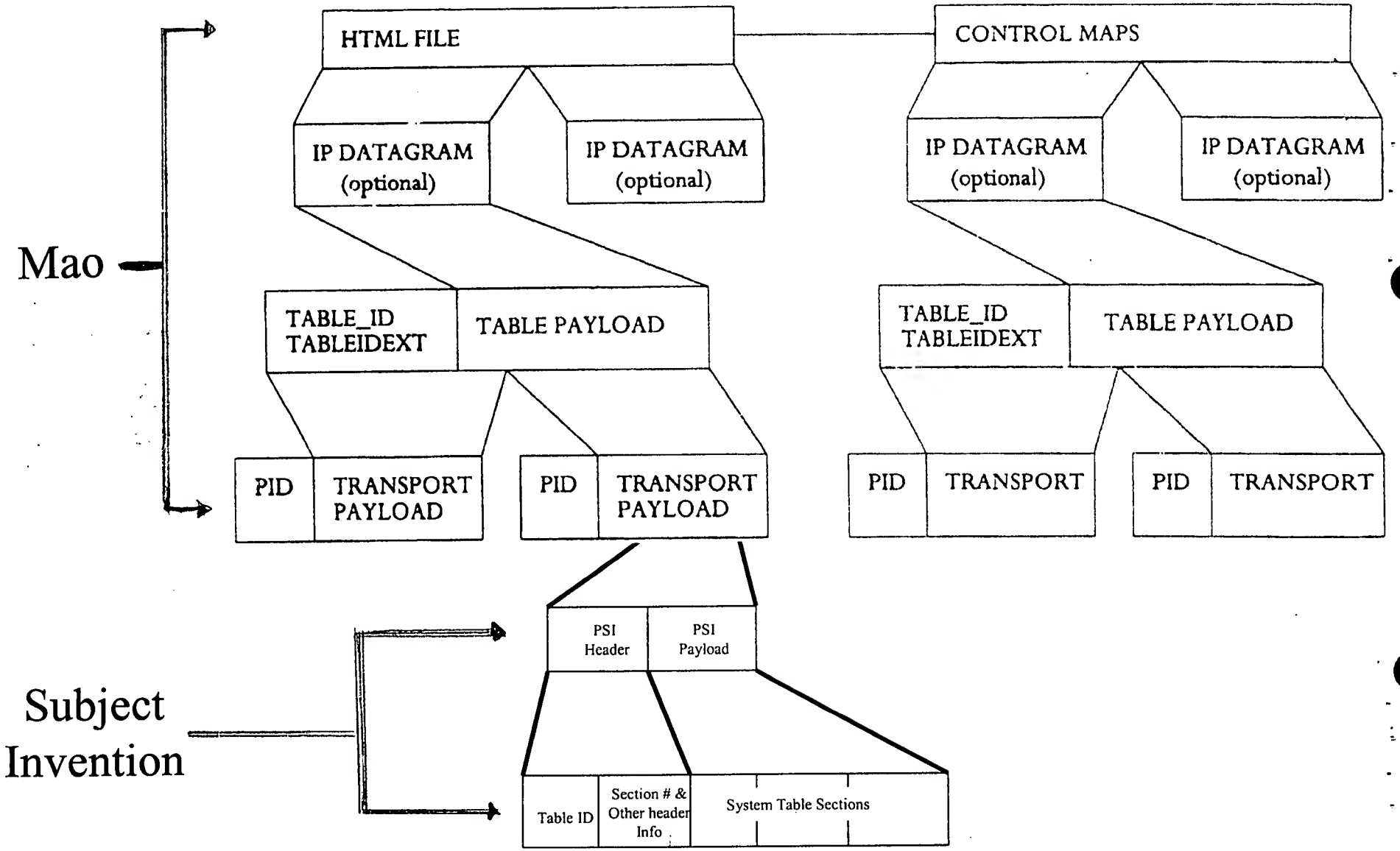
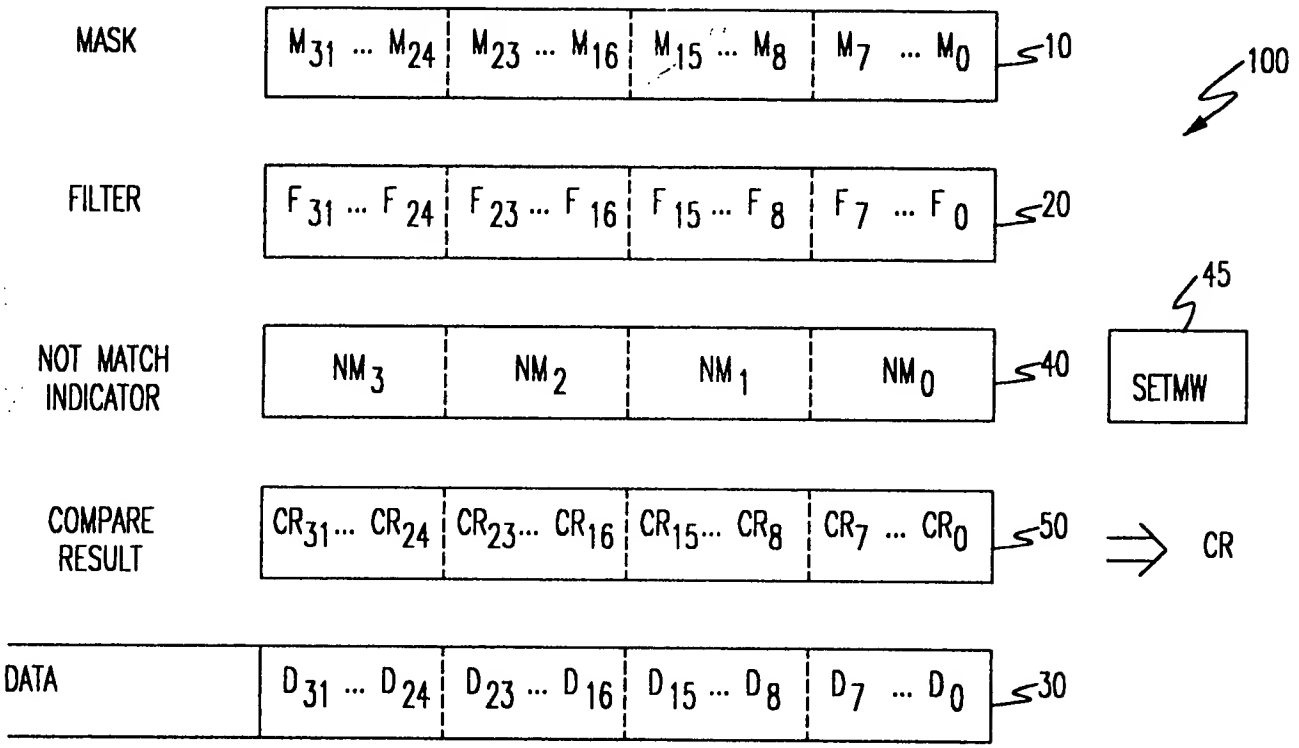


Figure C

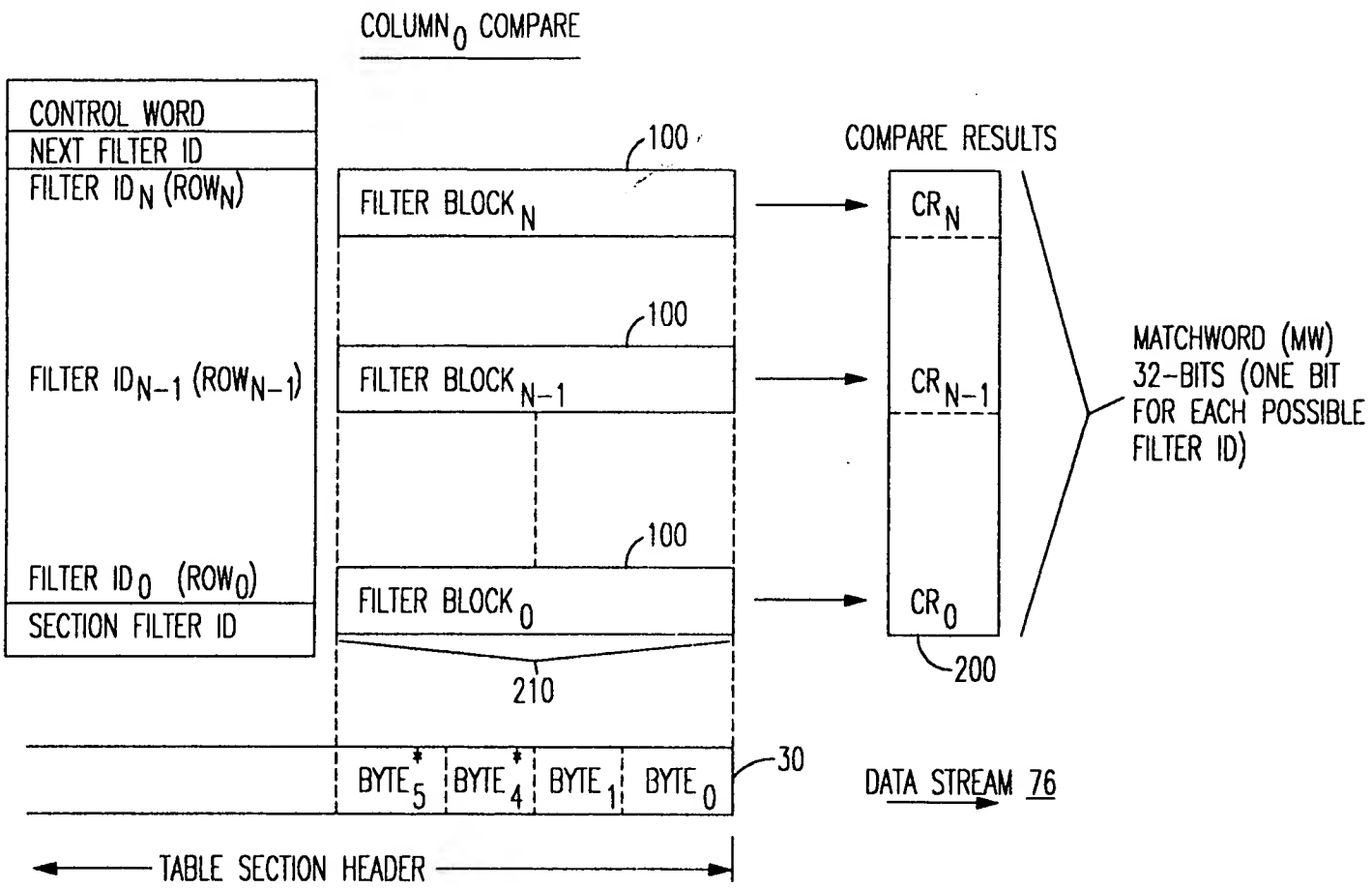
ATTACHMENT B

FILTER BLOCK COMPARE (32-BIT)



ONLY COMPARE BITS WHERE $M_i = 1$
IF NM=0, CR_i = TRUE(1) WHEN $D_i = F_i$, $CR = CR_0 \circ CR_1 \circ$ .....
IF NM=1, CR_i = TRUE(1) WHEN $D_i \neq F_i$, $CR = CR_0 + CR_1 +$ .....

FIG. 1



*NOTE: IN MPEG IMPLEMENTATION BYTES 2&3 OF THE TABLE SECTION HEADER ARE SKIPPED

FIG. 2

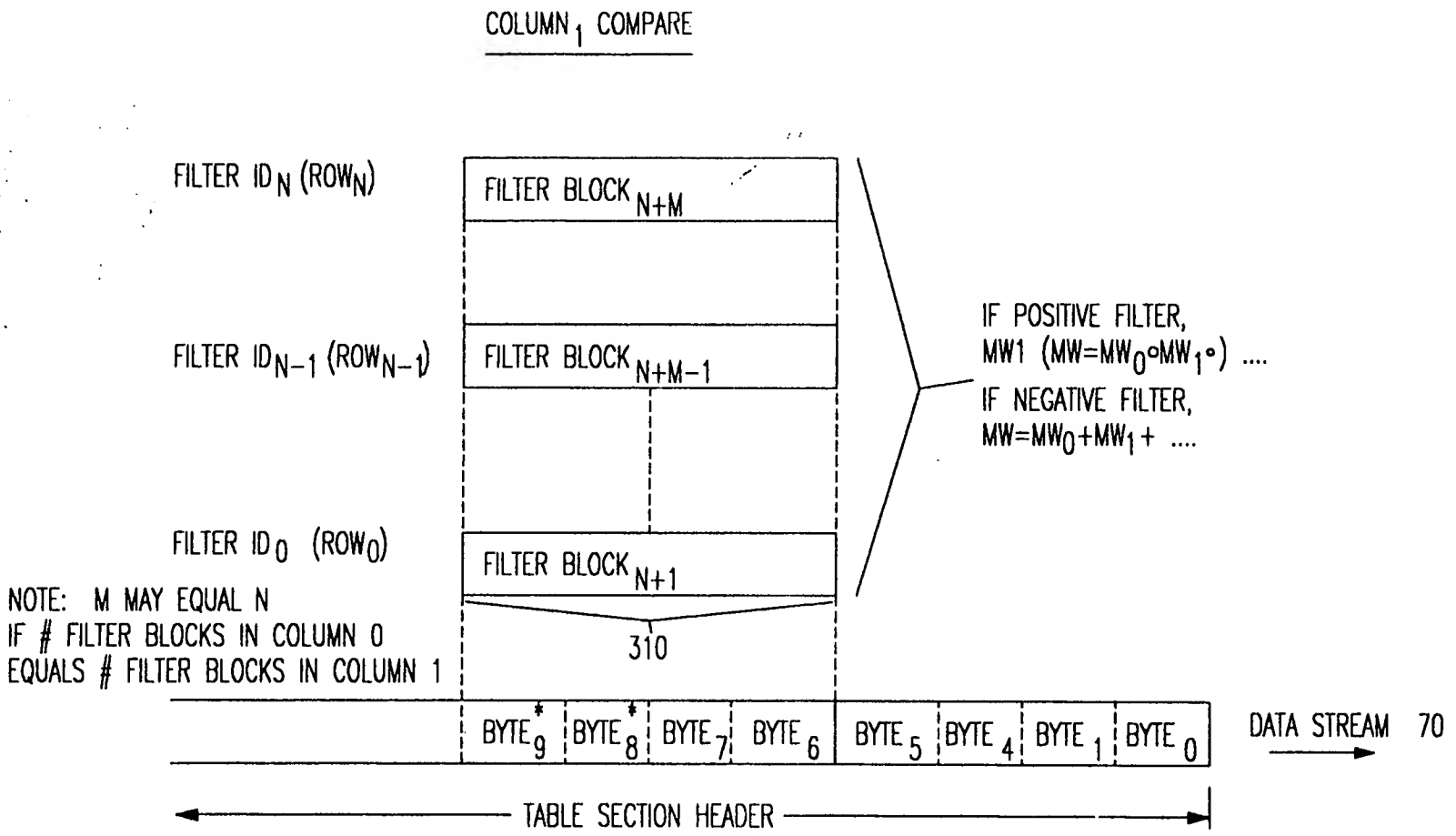


FIG. 3

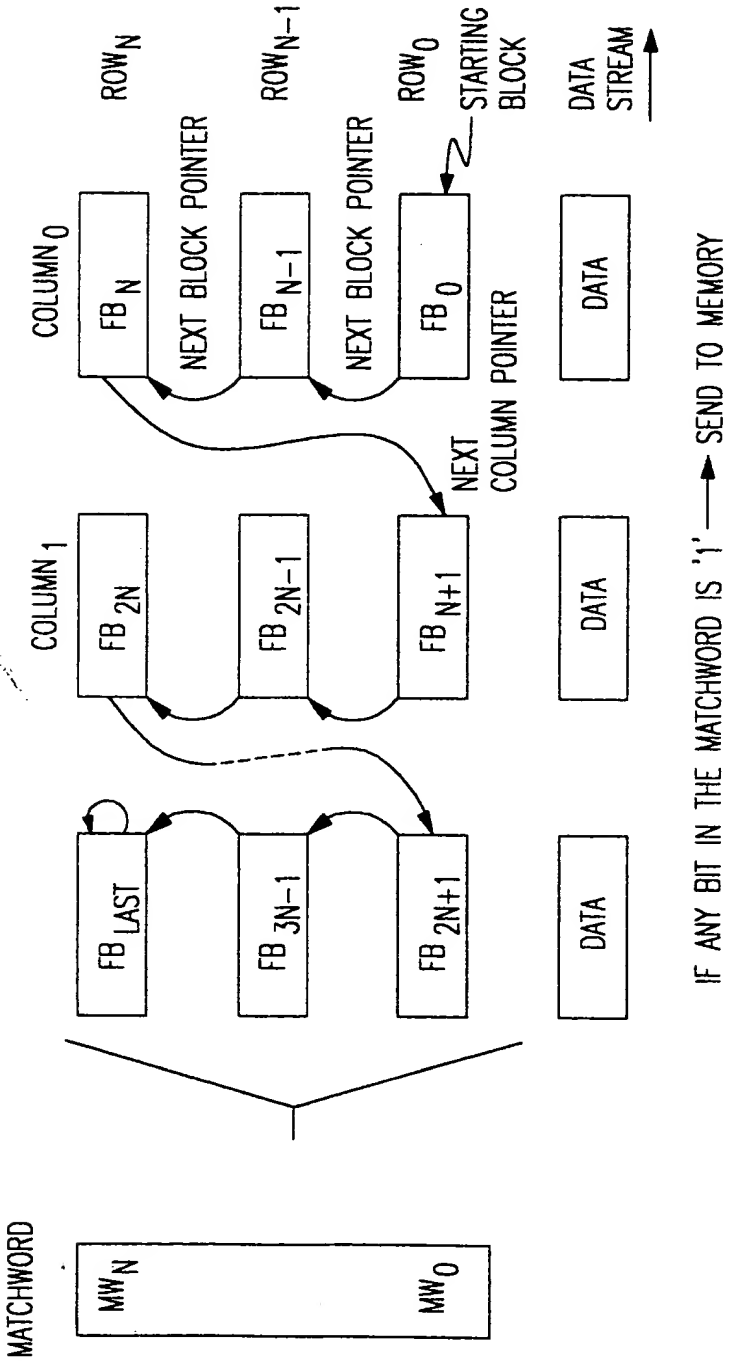


FIG. 4